Sheet 1 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Laser Alignment Applicant: Tacklind, et al. Appl. No.: 09/928,244 Filing Date: August 10, 2001

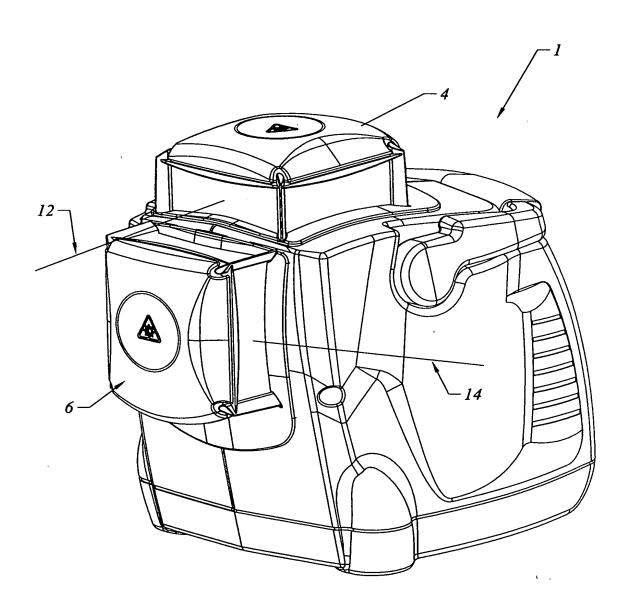


FIG. 1A

Sheet 2 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660



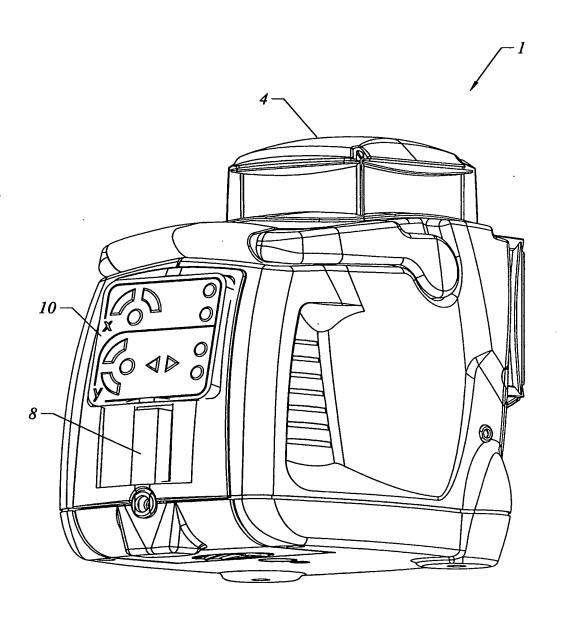




FIG. 1B

Sheet 3 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

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FIG. 2A

Sheet 4 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

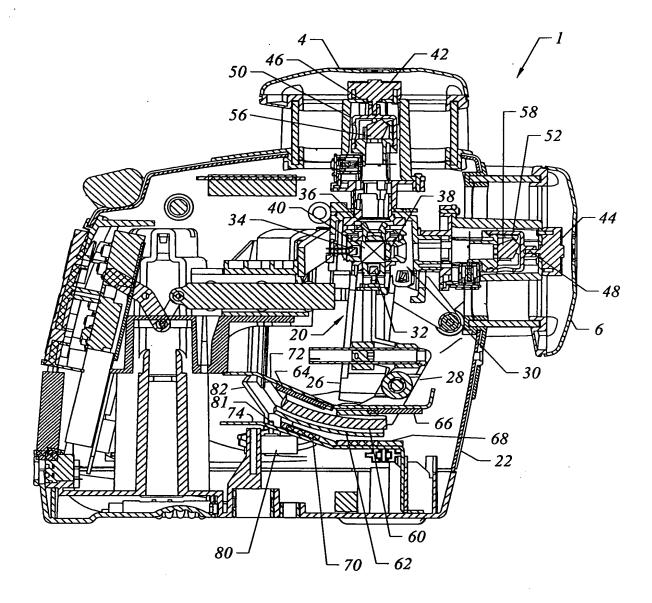


FIG. 2B

Sheet 5 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

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FIG. 2C

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Sheet 6 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

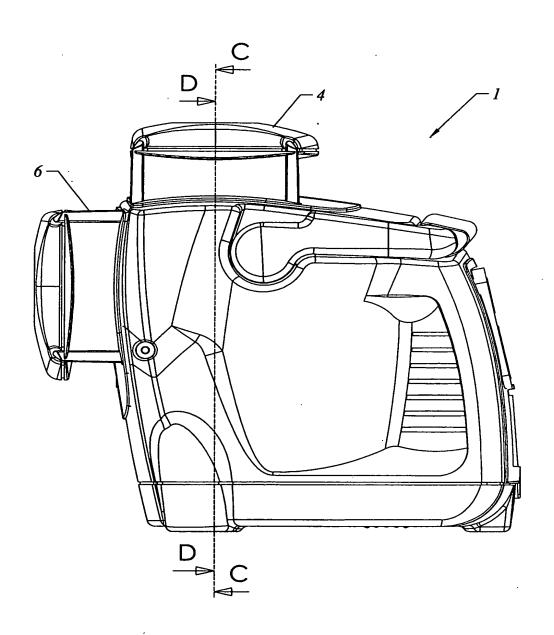


FIG. 2D

Sheet 7 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

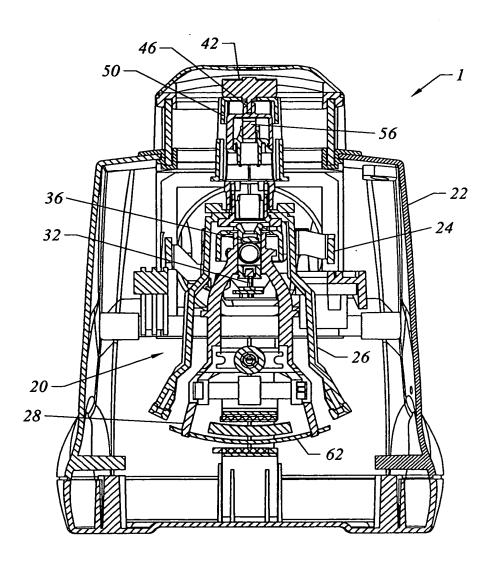


FIG. 2E

Sheet 8 of 31
Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

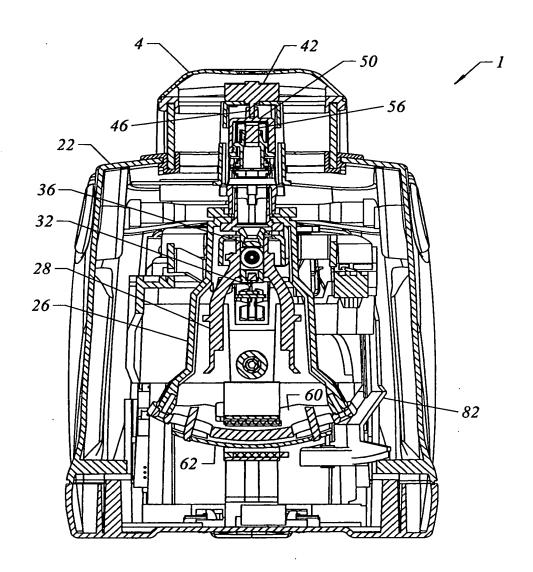


FIG. 2F

Sheet 9 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

Sheet 10 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

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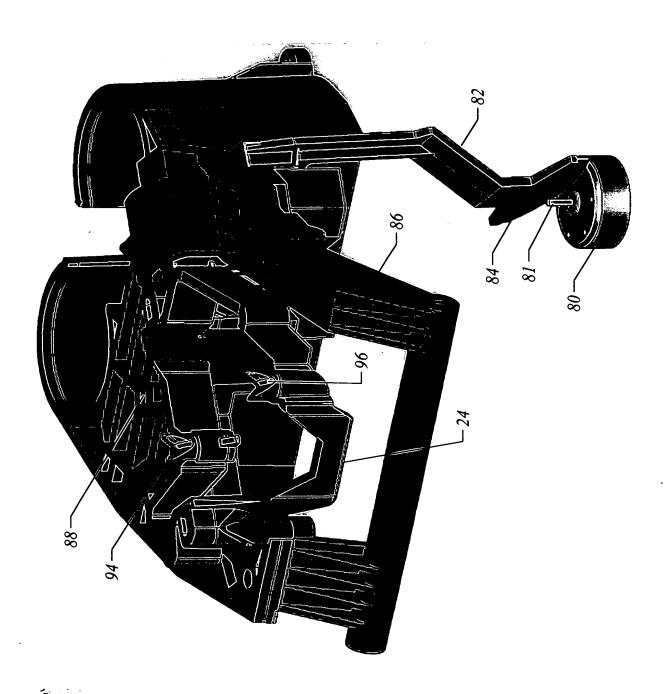


FIG. 3B

Sheet 11 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

FIG. 4A

Sheet 12 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

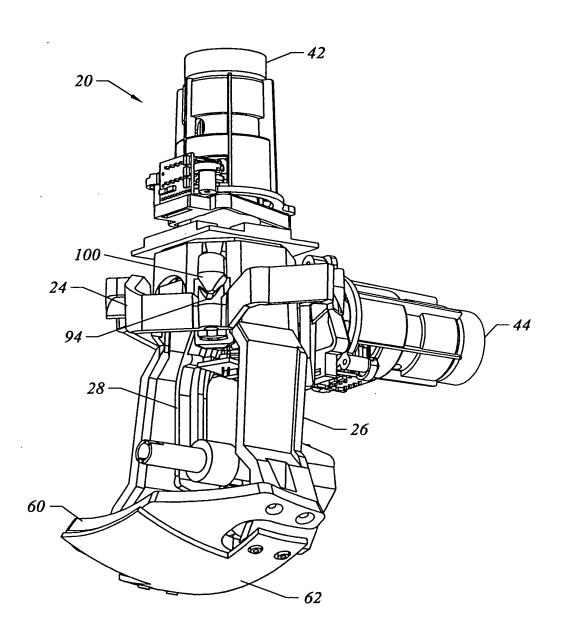


FIG. 4B

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Sheet 13 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

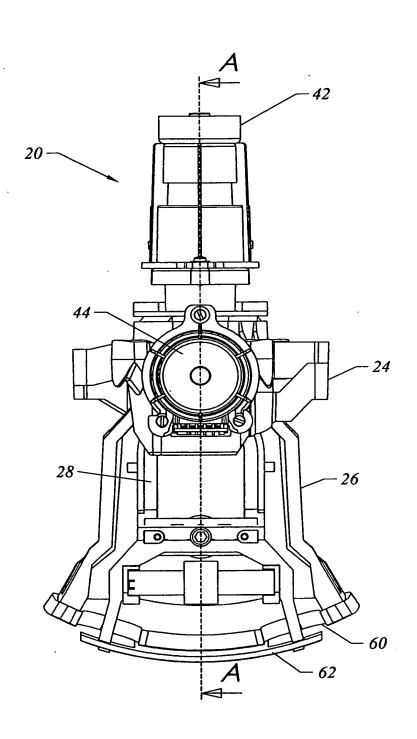


FIG. 4C

Sheet 14 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0

09/928,244 Atty: William J. Harmon, III

August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

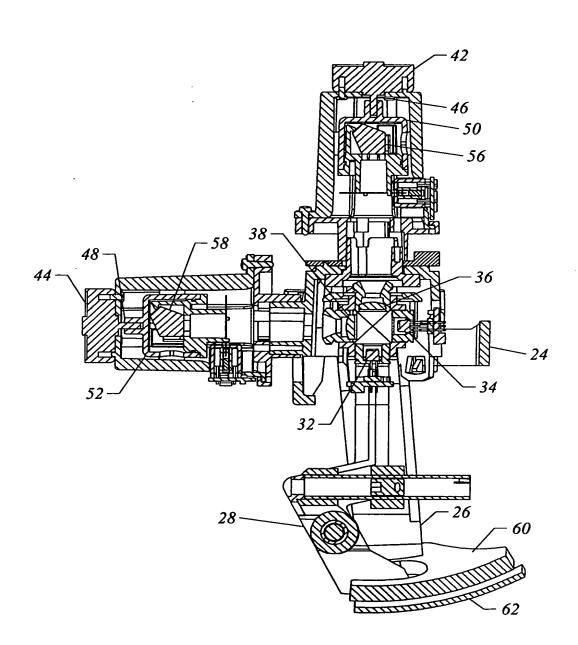
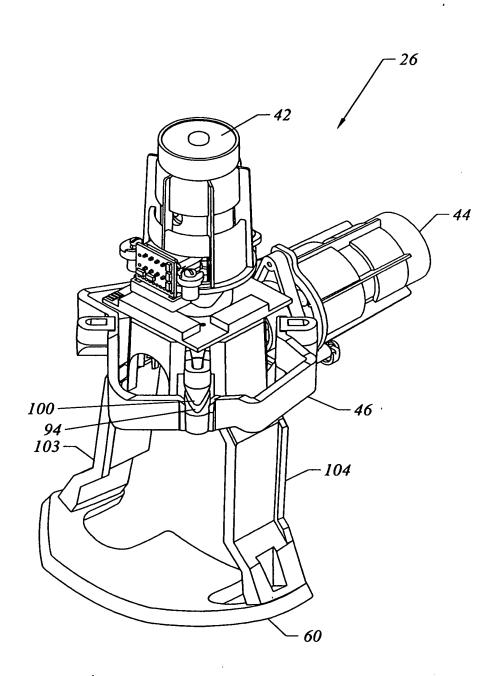


FIG. 4D

Sheet 15 of 31

Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660

Title: Applicant: Appl. No.: Filing Date:





Sheet 16 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0

09/928,244 Atty: William J. Harmon, III

August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

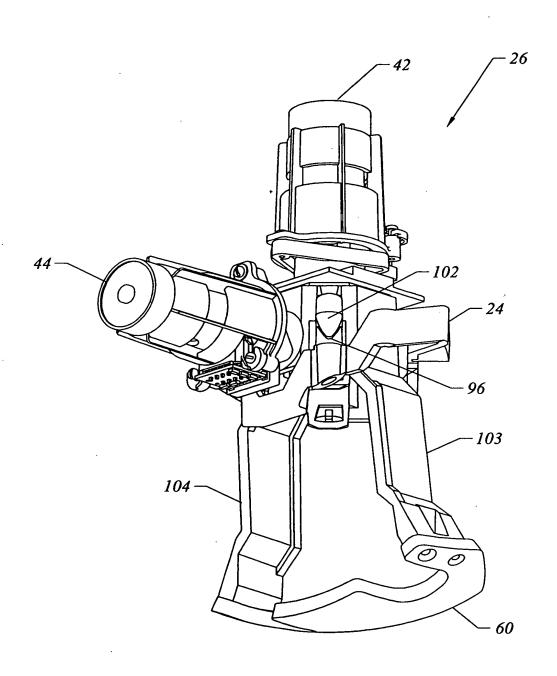
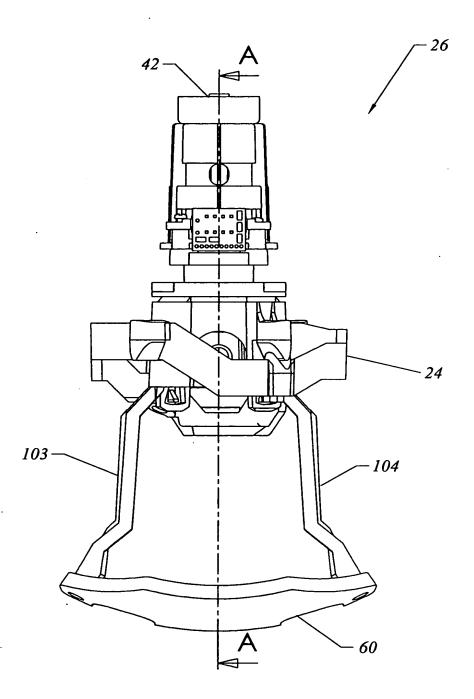


FIG. 5B

Sheet 17 of 31

Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:





Sheet 18 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

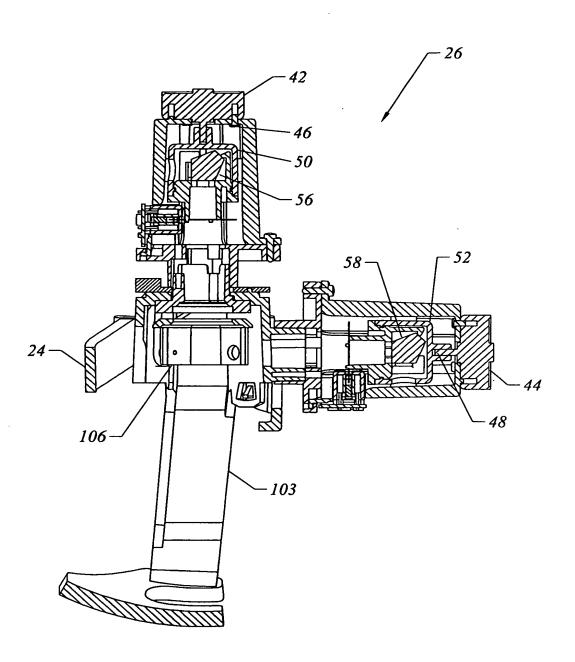




FIG. 5D

Sheet 19 of 31

Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, Ill
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

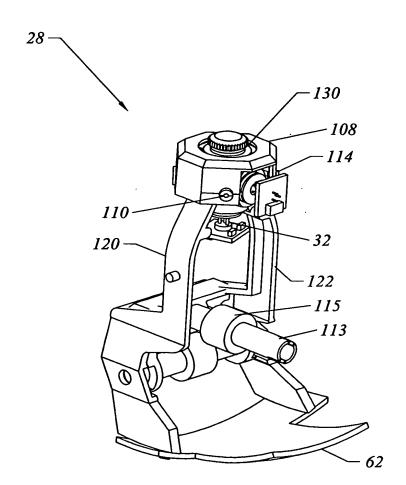


FIG. 6A

Sheet 20 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

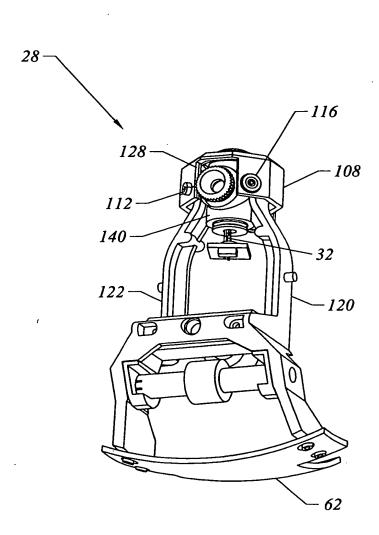


FIG. 6B

Sheet 21 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

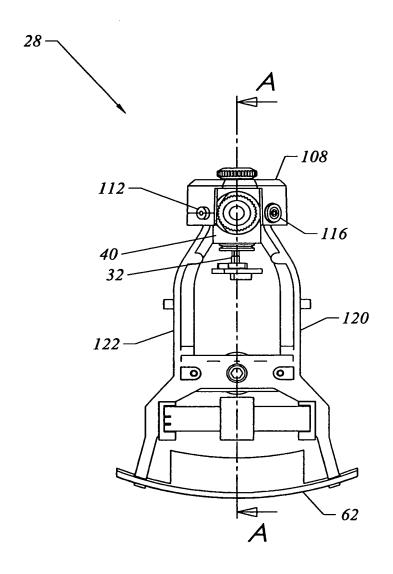
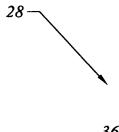


FIG. 6C

Sheet 22 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:



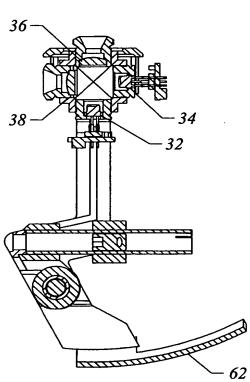


FIG. 6D



Sheet 23 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

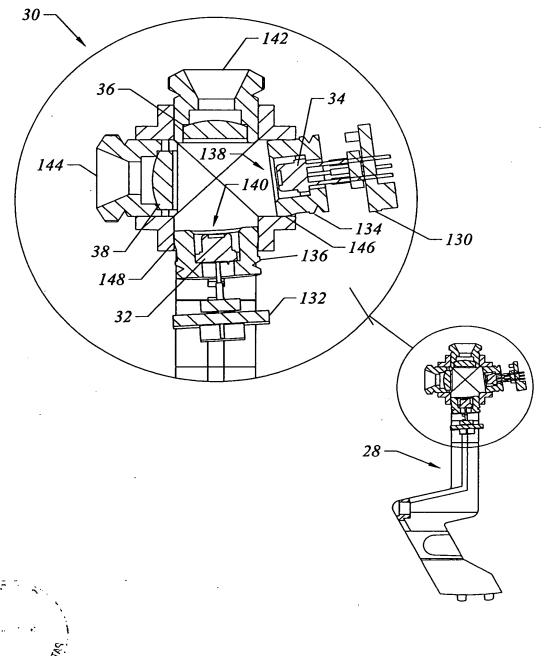


FIG. 7

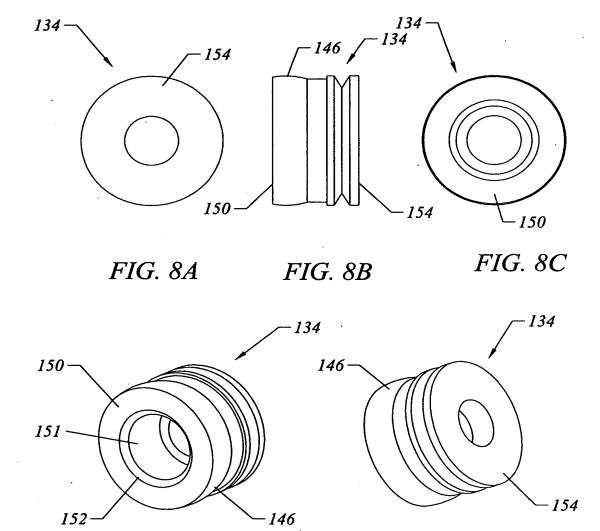


FIG. 8D

FIG. 8E



Sheet 25 of 31

Title: Laser Alignment Device Providing Multiple References

Applicant: Tacklind, et al. Docket: TOOLZ-01100US0

Appl. No.: 09/928,244 Atty: William J. Harmon, III

Filing Date: August 10, 2001 Phone: (415) 369-9660

170 177 -172 176 - 180 184 182

FIG. 9

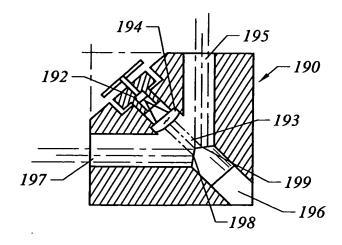


FIG. 10

Sheet 26 of 31

Laser Alignment Device Providing Multiple References

Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

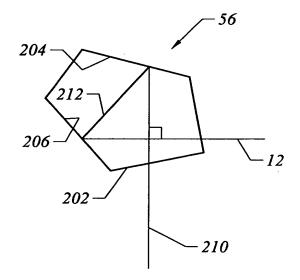


FIG. 11

Sheet 27 of 31

Title: Laser Alignment Device Providing Multiple References
Applicant: Tacklind, et al. Docket: TOOLZ-01100US0
Appl. No.: 09/928,244 Atty: William J. Harmon, III
Filing Date: August 10, 2001 Phone: (415) 369-9660

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. <u>1</u> **Output Beam** Subsystem 222 <u>224</u> <u>244</u> **Yaw Motor** 1/0 Interface <u> 246</u> Data <u>234</u> Storage <u>226</u> Horizontal **Beam Motor** 1/0 <u>248</u> **Interface** <u>236</u> **Vertical Beam** Motor 1/0 Interface <u> 250</u> <u>238</u> Controller <u>228</u> Local User 1/0 Interface <u> 252</u> 10 232 **Remote User** 1/0 Interface <u>254</u> Memory <u>8</u> <u>230</u> Remote Control <u>221</u> FIG. 12

Sheet 28 of 31

Title: Applicant: Appl. No.:

Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100 09/928,244

Atty:

Phone:

Filing Date: August 10, 2001

TOOLZ-01100US0 William J. Harmon, III (415) 369-9660

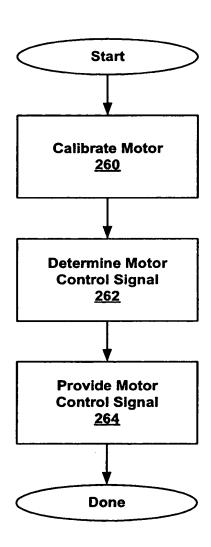


FIG. 13A

Sheet 29 of 31

Title: Laser Alignment Device Providing Multiple References
Applicant: Tacklind, et al. Docket: TOOLZ-01100US0
Appl. No.: 09/928,244 Atty: William J. Harmon, III
Filing Date: August 10, 2001 Phone: (415) 369-9660

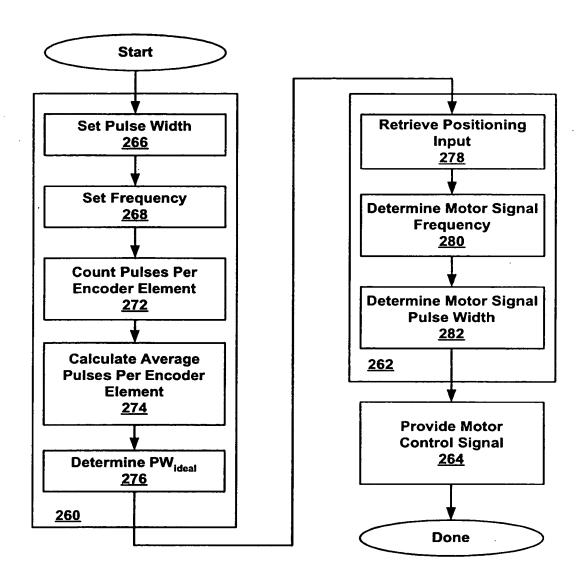


FIG. 13B

Sheet 30 of 31

Title: Applicant: Appl. No.: Filing Date:

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Laser Alignment Device Providing Multiple References Tacklind, et al. 09/928,244 August 10, 2001

Docket:

TOOLZ-01100US0

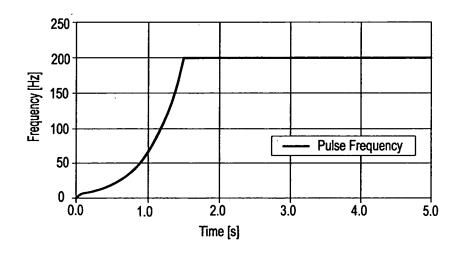
Atty: Phone:

William J. Harmon, III (415) 369-9660

800 700 600 Ideal Pulse Width [us] 500 y= 162.92Ln(x) + 277.02 R² = 0.9408 400 300 200 Pulse Width (Ideal) 100 Log. (Pulse Width (Ideal)) 0 Ó 20 10 15 5

FIG. 14

Pulses/Encoder with PW = 1000us



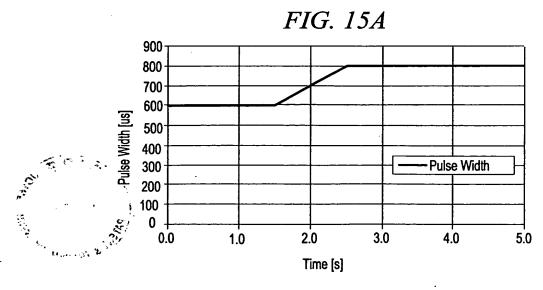


FIG. 15B

Sheet 31 of 31

Laser Alignment Device Providing Multiple References
Tacklind, et al. Docket: TOOLZ-01100US0
09/928,244 Atty: William J. Harmon, III
August 10, 2001 Phone: (415) 369-9660 Title: Applicant: Appl. No.: Filing Date:

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290 L₂₉₂ 294 - 296 - 302 *- 298* 300

FIG. 16